

Office Action Summary

Application No.

10/736,955

Applicant(s)

XU ET AL.

Examiner

David N. Werner

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-36 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 31 August 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Informal Disclosure Statement(s) (PTO/SB/02)
Paper No(s)/Mail Date _____
4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date 20090710
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

1. This Office action for U.S. Patent Application 10/736,955 is responsive to communications filed 22 April 2009, in reply to the Non-Final Rejection of 23 January 2009. Currently, Claims 1–36 are pending.
2. In the previous Office action, Claim 31 was objected to for failing to limit a parent claim. Claims 1–9 were rejected under 35 U.S.C. 101 as non-statutory. Claims 1–5, 7–14, 16–23, 25–32, and 34–36 were rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent Application Publication 2003/0058931 A1 (Zhang et al.) in view of U.S. Patent Application Publication 2003/0002579 A1 (Radha et al.). Claims 6, 15, 24, and 33 were rejected under 35 U.S.C. 103(a) as obvious over Zhang et al. in view of Radha et al. and in view of U.S. Patent 5,742,343 A (Haskell et al.).

Response to Amendment

3. Applicant's amendments to the claims have been fully considered. The objection to Claim 31 is withdrawn.
4. Applicant's amendments to the claims have been fully considered. The rejection of Claims 1–9 under 35 U.S.C. 101 is withdrawn.

Response to Arguments

5. Applicant's arguments filed with respect to Claim 1 have been fully considered but they are not persuasive. Applicant states that the Zhang reference differs from the

invention as presented in Claim 1 since in the present invention, an enhancement layer bitstream is decoded "as the base layer is encoded", that is, the base layer does not undergo any decoding, whereas in the Zhang reference, FGS encoder 510 generates an enhancement layer bitstream "with partial or full decoding of the base layer bitstream 511". However, the first step in the method of Claim 1 is a step of "decoding an enhancement layer bitstream". This means that the enhancement layer is already encoded at the start of the claimed method. The initial encoding process described in Zhang et al. is outside the scope of the claim and therefore irrelevant to the claim as currently presented. Instead, at Zhang et al., the decoding of the enhancement layer is performed in VBR transcoder 540, not encoder 510. Since this transcoder does not decode base layer data to transcode, or decode and re-encode enhancement layer data, the Zhang reference performs the claimed decoding of an enhancement later bitstream "as the base layer is encoded". Additionally, it appears the phrase "as the base layer is encoded", interpreted as meaning that no decoding step is performed on the base layer, is new matter. Figure 4 illustrates a block diagram of the claimed invention, including Variable Length Decoder 432 which performs variable length decoding on a base layer bitstream in the process of extracting motion vectors for use in the enhancement layer transcoding, described in paragraph 0026 of the specification.

Considering this, the examiner respectfully maintains the prior art rejections.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1, 10, 19, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 10, 19, and 28 each recite a process of decoding an enhancement layer "as the base layer is encoded". Paragraph 0026 of the specification states that "without decoding or otherwise modifying corresponding base layer bitstream...the transcoder extracts motion vectors from the base layer to transcode the enhancement layer". Figure 4 illustrates this process. Although base layer bitstream 402 is not decoded and remains unmodified between its input and output, the base layer is also shown as passing through Variable Length Decoder 432 to produce motion vectors 406 for use in Motion Compensation block 428. Accordingly, the process of "extracting motion vectors" described in the specification, as part of the claimed step of "decoding an enhancement layer bitstream" inherently involves a partial decoding of the base layer bitstream. Then, the claimed process of decoding the enhancement layer bitstream "as the base layer is encoded" incorporates new matter. The previous claim language, stating that the enhancement layer bitstream is decoded "without decoding an encoded base layer bitstream" was interpreted as meaning that the base layer is not fully decoded, allowing for the partial decoding illustrated in figure 4 of the specification.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-5, 7-14, 16-23, 25-32, and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication 2003/0058931 A1 (Zhang et al.) in view of US Patent Application Publication 2003/0002579 A1 (Radha et al.). Zhang et al. teaches a method of transcoding scalable video comprising a base layer and enhancement layer. Regarding independent claim 1, figure 5 of Zhang et al. illustrates the transcoder system, performed in a server for video transmission (paragraph 0014). After initially encoding the base and enhancement layers (paragraph 0048), in transcoding, enhancement layer 512 is transcoded in transcoder 540 to output enhancement layer video 519, without transcoding base layer 511 (paragraph 0050). The transcoded enhancement layer 519 and original base layer 511 may be stored on a disc or transmitted over a network (paragraph 0051). Then, transcoder 540 performs the claimed step of "decoding an enhancement layer bitstream...as the base layer is encoded". This transcoding is performed based on minimizing distortion for a current available bitrate (paragraph 0054), and adjusts rate budget $W(a)$ based on network conditions in a bit-rate allocation scheme (paragraph 0073). Then, Rate-Distortion Extractor 520 performs the claimed step of "determining data throughput characteristics

of a network coupled to a client computing device", and "calculating a new HQRB" to determine "how many bits of the enhancement layer bitstream are used to reconstruct a high quality reference image", where $W(a)$ is the HQRB. Then, transcoder 540 which produces the new enhancement layer bitstream performs the claimed step of "encoding the enhancement layer bitstream".

The present invention differs from Zhang et al. in that the present invention determines the new HQRB as the difference between network bandwidth and encoded base layer bandwidth, whereas Zhang calculates a bit rate for the video as a whole, without separating base layer and enhancement layer throughputs.

Radha et al. teaches a system for transmitting video over a variable-bandwidth network, in which the video, comprising a base layer and enhancement residual layers, may change coding according to variable bandwidth. Regarding claim 1, in Radha et al., a selected enhancement layer bitstream is encoded at a rate $R(\text{MAX}) - R(\text{BL})$ (paragraph 0049), in which $R(\text{MAX})$ is the maximum available network bandwidth (paragraph 0040) and $R(\text{BL})$ is the bitrate of an encoded base layer (paragraph 0041). If available bandwidth is reduced to a smaller value R less than $R(\text{MAX})$, the transmitter adjusts to output an enhancement layer of bandwidth $R - R(\text{BL})$ (paragraph 0051). Then $R - R(\text{BL})$ is the claimed "difference between the data throughput characteristics of the network and a bit rate of the encoded base layer", and the video output in Radha et al. is "at least partially optimized for the throughput characteristics of the content distribution network".

Zhang et al. discloses the claimed invention except for determining bit rate of an enhancement layer as the difference between available bit rate and base layer bit rate. Radha et al. teaches that it was known in the art to provide this determination of bitrate. Therefore, it would have been obvious to one having ordinary skill in the art at the time the present invention was made to substitute the enhancement layer bitrate determination control of Radha et al. for the bitrate determination control of Zhang et al. with the predictable result of producing "a coded residual image which is most appropriate for the available bandwidth", (paragraph 0012), that is to say, "at least partially optimized for the throughput characteristics of the content distribution network", since it has been held that simple substitution of one element in the art for another to obtain predictable results only involves routine skill in the art. *In re Fout*, 675 F.2d 297, 301, 213 USPQ 532, 536 (CCPA 1982); *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673 (Fed. Cir. 1988); *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004); *Ex Parte Smith*, 83 USPQ 2d 1509 (BPAI 2007).

Regarding independent claims 10, 19, and 28, Radha et al. operates on a personal computer (paragraphs 0032-0035).

Regarding claims 2, 11, 20, and 29, as previously mentioned, the enhancement layer rate selection control in Radha et al. was designed to produce the enhancement layer "most appropriate for the available bandwidth" (paragraph 0012).

Regarding claims 3, 12, 21, and 30, Zhang et al. operates on FGS-encoded video (paragraphs 0018-0019).

Regarding claims 4, 13, 22, and 31, in Radha et al., when a receiver bandwidth decreases, an enhancement layer of residual images having a lower bit rate is selected, and regarding claims 5, 14, 23, and 32, in Radha et al., when a receiver bandwidth increases, an enhancement layer of residual images having a higher bit rate is selected (paragraph 0014).

Regarding claims 7, 16, 25, and 34, in Zhang et al., the base layer 511 and transcoded enhancement layer 512 may be "transmitted through a network 550 synchronously as they are transcoded" (paragraph 0051).

Regarding claims 8, 17, 26, and 35, in Zhang et al., FGS encoder 510 performs the encoding of the base layer and original input enhancement layer (paragraph 0048).

Regarding claims 9, 18, 27, and 36, in Radha et al., a maximum bit rate may be determined based on if "the receiving device has sufficient processing power to handle those additional frames" produced at a higher bit rate (paragraph 0005).

10. Claims 6, 15, 24, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. in view of Radha et al., and in view of US Patent 5,742,343 A (Haskell et al.). Claims 6, 15, 24, and 33 of the present invention teach encoding enhancement layers from motion vectors derived from a base layer. In contrast, the enhancement layer transcoding in Zhang et al. appears to be independent of the base layer (figure 5).

Haskell et al. teaches a scalable video encoder and decoder. Regarding claims 6, 15, 24, and 33, in Haskell et al., the embodiment in figure 20, showing an encoder

having a base encoder and an enhancement encoder, is exemplary. In the enhancement encoder, motion estimator 640 compares an enhancement layer frame with a base layer prediction frame, and uses the base layer pels and motion vectors to output enhancement layer motion vectors to motion compensation with a previous enhancement frame (column 12: lines 9-31). By placing this motion compensation system in transcoder 540 of Zhang et al., the present invention is achieved.

Zhang et al., in combination with Radha et al., discloses the claimed invention except for using base-layer motion vectors to encode an enhancement layer in a video coder. Haskell et al. teaches that it was known to perform motion compensation in an enhancement coder from base level motion vectors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the enhancement layer motion compensation system of Haskell et al. into the enhancement layer transcoder of Zhang et al., since Haskell et al. states in column 29: lines 1-29 that such a modification would increase accuracy of coding enhancement layer data by increasing the number of available sources for motion compensation.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 2621

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